Dans l'équation différentielle : $-\frac{A}{\tau}e^{-\frac{t}{\tau}} + \frac{A}{RC}e^{-\frac{t}{\tau}} = 0 \Leftrightarrow$

$A\,e^{-\frac{t}{\tau}}\left(-\frac{1}{\tau}+\frac{1}{RC}\right) = 0$ Or $A \neq 0$ et $e^{-\frac{t}{\tau}} \neq 0 \Leftrightarrow \tau = RC$

$i(t) = I_0\, e^{-\frac{t}{RC}} = -\frac{U_0}{R}\, e^{-\frac{t}{RC}}$

b) $\tau = RC = 4{,}7\ 10^3 . 470\ 10^{-6} = 2{,}209$ s

$A = -\frac{U_0}{R} = -\frac{10}{4{,}7.10^3} = -\,2{,}127.10^{-3}\ V.\Omega^{-1}$

c) $u_{BA}(t) = -\,u_{EF} = -\,R.i(t) \Leftrightarrow u(t) = R.\frac{U_0}{R}\, e^{-\frac{t}{RC}} \Leftrightarrow u(t) = U_0.\ e^{-\frac{t}{RC}}$

3)

a) $t = t_{\frac{1}{2}}$: on a $u_{BA} = \frac{U_0}{2} \Leftrightarrow U_0.e^{-\frac{t_{\frac{1}{2}}}{RC}} = \frac{U_0}{2} \Leftrightarrow e^{-\frac{t_{\frac{1}{2}}}{RC}} = \frac{1}{2} \Leftrightarrow$

$-\frac{t_{\frac{1}{2}}}{RC} = \ell n\frac{1}{2} \Leftrightarrow t_{\frac{1}{2}} = -\,RC\ \ell n\frac{1}{2} = -\,\tau\ \ell n\frac{1}{2} = -\,2{,}209\ \ell n\frac{1}{2} = 1{,}53$s

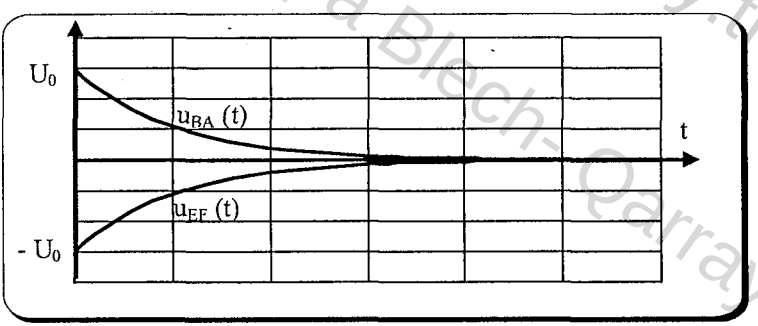
b) $u_{BA} = \frac{U_0}{4} \Leftrightarrow U_0.e^{-\frac{t}{RC}} = \frac{U_0}{4} \Leftrightarrow e^{-\frac{t}{RC}} = \frac{1}{4} \Leftrightarrow -\frac{t}{RC} = \ell n\frac{1}{4} \Leftrightarrow$

$t = -\,RC\ \ell n\frac{1}{4} = -\,\tau\ \ell n\frac{1}{4} = -\,2{,}209\ \ell n\frac{1}{4} = 3{,}062$ s.

$u = \frac{U_0}{8} \Leftrightarrow U_0.e^{-\frac{t}{RC}} = \frac{U_0}{8} \Leftrightarrow e^{-\frac{t}{RC}} = \frac{1}{8} \Leftrightarrow -\frac{t}{RC} = \ell n\frac{1}{8} \Leftrightarrow$

$t = -\,RC\ \ell n\frac{1}{8} = -\,\tau\ \ell n\frac{1}{8} = -\,2{,}209\ \ell n\frac{1}{8} = 4{,}593$ s

4) $u_{BA}(t) = U_0.\ e^{-\frac{t}{RC}}$ et $u_{EF}(t) = -\,u_{BA}(t) = -\,U_0 e^{-\frac{t}{RC}}$



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